



FORM PTO-1449

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47756CIP1DIV

SERIAL NO.:

09/750,402

INFORMATION DISCLOSURE  
STATEMENT

APPLICANT(S): R. Formato, et al.

FILING DATE:

December 28, 2000

GROUP NO.:

Unassigned

## UNITED STATES PATENT DOCUMENTS

EXAM. INITIALS		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
RAM	AA	4,714,663 A	December 22, 1987	Arnold, Jr., et al.			
RAM	AB	4,865,930 A	September 12, 1989	K. Andrew, et al.			

## FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES/NO
RAM	BA	0 227 299 A	July 1, 1987	EPO			N/A
RAM	BB	0 277 834 A	August 10, 1988	EPO			

## OTHER DOCUMENTS (INCLUDING AUTHOR, TITLE, DATE, PERTINENT PAGES, ETC.)

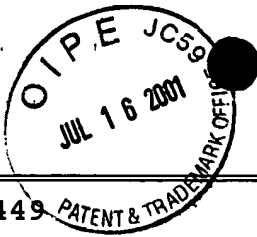
RAM	CA	Database WPI, sec. Ch., Week 198049, Derwent Publications, Ltd., London, GB; Class A25, AN 1980-87481C, XP002164079. JP 55137005 A, Teijin Ltd., October 25, 1980. (Abstract)					
	CB	<del>Database WPI, sec. Ch., Week 198434, Derwent Publications, Ltd., London, GB; Class A88, AN 1984-209372, XP002164080. JP 59120211 A, Asahi Glass Co. Ltd., July 11, 1984. Not available</del>					

EXAMINER:

RAM

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11/20/02



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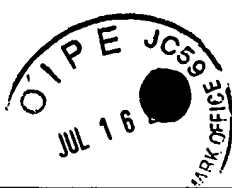
APPLICANT(S):  
Richard Formato, et al.

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EXAM. INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FIL. DATE IF APPR
RAM	AA	3,284,238	11/08/66	M.L. White			
	AB	3,528,954	09/15/70	D.P. Carlson			
	AC	4,110,265	08/29/78	Hodgdon			
	AD	4,116,888	09/26/78	Ukihashi, et al.			
	AE	4,138,373	02/06/79	Ukihashi, et al.			
	AF	4,138,426	02/06/79	Ukihashi, et al.			
	AG	4,191,811	03/04/80	Hodgdon			
	AH	4,273,903	06/16/81	Rose			
	AI	4,330,654	05/18/82	Ezzell, et al.			
	AJ	4,358,412	11/09/82	Ezzell, et al.			
	AK	4,413,106	11/01/83	Coplan, et al.			
	AL	4,814,399	03/21/89	Sansone, et al.			
	AM	4,845,150	07/04/89	Kovar, et al.			
	AN	5,013,765	05/07/91	Sluma, et al.			
	AO	5,168,011	12/01/92	Kovar, et al.			
	AP	5,202,165	04/13/93	Lusignea, et al.			
Examiner: RAM				Date: 11/20/02			



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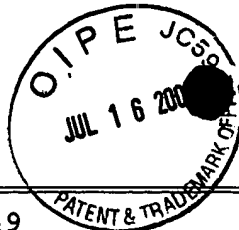
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Rfm	AQ	5,259,950	11/09/93	Shiro, et al.			
	AR	5,271,813	12/21/93	Linkous			
	AS	5,288,529	12/22/94	Harvey, et al.			
	AT	5,300,206	04/05/94	Allen, et al.			
	AU	5,348,569	09/20/94	Bikson, et al.			
	AV	5,403,675	04/04/95	Ogata, et al.			
	AW	5,422,411	06/06/95	Wei, et al.			
	AX	5,438,082	08/01/95	Helmer-Metzmann, et al.			
	AY	5,501,831	03/26/96	Kovar, et al.			
	AZ	5,525,436	06/11/96	Savinell, et al.			
	BA	5,547,551	08/20/96	Bahar, et al.			
	BB	5,561,202	10/01/96	Helmer-Metzmann, et al.			
	BC	5,585,039	12/17/96	Matsumoto, et al.			
	BD	5,599,614	02/04/97	Bahar, et al.			
	BE	5,599,638	02/04/97	Surampudi, et al.			
	BF	5,599,639	02/04/97	Sansone, et al.			
	BG	5,609,795	03/11/97	Matsumoto, et al.			

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Rfm

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EXAM. INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FIL. DATE IF APPR
RAM ↓	BH	5,635,041	06/03/97	Bahar, et al.			
	BI	5,656,389	08/12/97	Tetzlaff, et al.			
	BJ	5,723,086	03/03/98	Ladjeff, et al.			
	BK1	5,773,162	06/30/98	Surampudi, et al.			
	BK2	09/262,861		Formato, et al.			

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RAM ↓	BL	WO 96/40798	19/12/96	PCT			
	BM	WO 97/24777	10/07/97	PCT			
	BN	WO 98/22989	28/05/98	PCT			
	BO	FR 2748485	14/11/97	France			

## OTHER DOCUMENTS (INCLUDING AUTHOR, TITLE, DATE, PERTINENT PAGES, ETC.)

RAM	CB	A.B. LaConti, et al., "Solid Polymer Electrolyte Electrochemical Cells: Electrode and Other Materials Considerations", General Electric Company, Wilmington, MA 1974, pp. 354-374. * No month available
RAM	CC	Ueda, et al., "Synthesis and Characterization of Aromatic PES Containing Pendant Sodium Sulfonate Groups", J. Polymer Science, Vol. 31, 1993, p. 853-858. *

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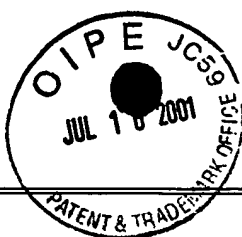
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RAM	CD	Kerres, et al., "New Ionomers and Their Applications in PEM Fuel Cells", ICE, Stuttgart, Germany, 1998, pp. 1951-1956.
	CE	Kreuer, K. D., "Membrane Materials for PEM Fuel Cells: A Microstructural Approach", Electrochemical Society Proceedings, Volume 95-23, pp. 241-246.
	CF	Xu, et al., "Preliminary Study of Phosphonate Ion Exchange Membranes for PEM Fuel Cells", SUNY, Syracuse, NY, 1996, 2 pgs.
	CG	Kolde, et al., "Advanced Composite Polymer Electrolyte Fuel Cell Membranes", Electrochemical Society Proceedings, Volume 95-23, pp. 193-201.
	CH	Ren, et al., "Methanol Cross-over in Direct Methanol Fuel Cells", Electrochemical Society Proceedings, Volume 95-23, 1995, pp. 284-298.
	CI	Jones, D.J., et al., "New Proteon Conductors For Fuel Cell Applications", Environmental Research Forum, Vols. 1-2 (1996), p. 115-126.
	CJ	Sillion, B., et al., "Sulfonated Polyimides As Novel Proton Exchange Membranes For H <sub>2</sub> /O <sub>2</sub> Fuel Cells", Laboratoire Des Matériaux Organiques Aux Propriétés Spécifiques, Vernaison, France.
	CK	F. KuCera, et al., "Homogeneous and Heterogeneous Sulfonation of Polymers: A Review", Polymer Engineering and Science, May 1998, Vol. 36, No. 5, pp. 783-792.
	CL	Tsuchida, et al., "Synthesis and Proton Conductivity of Highly Sulfonated Poly (thiophenylene)", Macromolecules, 1997, Vol. 30, pp. 2941-2946.
	CM	M. Kurihara, et al., "The Major Developments of the Evolving Reverse Osmosis Membranes and Ultrafiltration Membranes", Polymer Journal, Vol. 23, No. 5, pp. 513-520.
	CN	P. Clemenson, et al., "Synthesis and Characterization of New Water-Soluble Precursors of Polyimides", Polymer Engineering and Science, June 1997, Vol. 37, No. 6, pp. 966-977.
✓	CO	L.H., Sperling, et al., "The Current Status of Interpreting Polymer Networks", IPNs Around the World, Edited by S.C. Kim and L.H. Sperling, 1997 John Wiley & Sons, Ltd.

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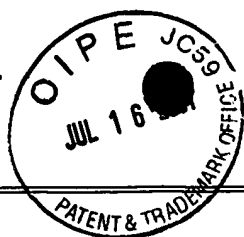
## OTHER DOCUMENTS (INCLUDING AUTHOR, TITLE, DATE, PERTINENT PAGES, ETC.)

RFM	CP	A.B. LaConti, et al., "Morphology And Reverse Osmosis Properties of Sulfonated 2,6-Dimethyl Polyphenylene Oxide Membranes", Reprinted from Reverse Osmosis Membrane Research, 1972, pp. 263-284.
	CQ	"Electrophilic Aromatic Sulfonation And Related Reactions" - PART 1, pp. 1-45.
	CR	D. Weng, et al., "Electro-osmotic Drag Coefficient of Water and Methanol in Polymer Electrolytes at Elevated Temperatures", J. Electrochem. Soc., Vol. 143, No. 4, April 1996, pp. 1260-1263.
	CS	A.V. Anantaraman, et al., "Studies on Ion-exchange Membranes. Part 1 Effect of Humidity on the Conductivity of Nafion", Journal of Electroanalytical Chemistry, 414 (1996), pp. 115-120.
	CT	Y. Sone, et al., "Proton Conductivity of Nafion 117 as Measured by a Four-Electrode AC Impedance Method", J. Electrochem. Soc., Vol. 143, No. 4, April 1996, pp. 1254-1259.
	CU	M. Schulze, et al., "Proton Exchange With Alkaline Ions in Nafion", six pages.
	CV	J.J. Sumner, et al., "Proton Conductivity in Nafion 117 and in a Novel Bis [(perfluoroalkyl)sulfonyl]imide Ionomer Membrane", J. Electrochem. Soc., Vol. 145, No. 1, January 1998, ppp. 107-111.
	CW	T. Okada, et al., "Transport And Equilibrium Properties of Nafion Membranes With H <sup>+</sup> and Na <sup>+</sup> Ions", Journal of Electroanalytical Chemistry, 442 (1998), pp. 137-145.
	CX	J. Kerres, et al., "Development and Characterization of Crosslinked Ionomer Membranes Based Upon Sulfinatedand Sulfonated PSU Crosslinked PSU Blend Membranes By Disproportionation of Sulfinic Acid Groups", Journal of Membrane Science, 239 (1998) pp. 211-225.
	CY	N.M., Belomonia, et al., "Thermoreactive Sulfur-Containing Poly(phenylquinoxaline)s", Polymer Science, Series B, Vol. 38, Nos. 1-2, 1996, pp. 98-100.
	CZ	T. Kobayashi, et al., "Proton-Conducting Polymers Derived from Poly(ether-etherketone) and Poly(4-phenoxybenzoyl-1-1,4-phenylene)", Solid State Ionics, 106 (1998), pp. 219-225.

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	DB	Y. Uchimoto, et al., "Ionically Conductive Thin Polymer Films Prepared by Plasma Polymerization, Part 7. Preparation and Characterization of Solid Polymer Electrolyte Having Fixed Carboxylic Acid Groups with Single Mobile Species", Solid State Ionics, 40/41 (1990), pp. 624-627.
	DC	S. Kim, et al., "Aromatic and Rigid Rod Polyelectrolytes Based on Sulfonated Poly(benzobishizoles)".
	DD	T.A. Zawadzinski, Jr., et al., "Water Uptake by and Transport Through Nafion 117 Membranes", Journal of the Electrochemical Society, Vol. 40, No. 4, April 1993, pp. 1041-1047.
	DE	A. Bhatnagar, et al., "Synthesis and Characterization of Polyphenylene Sulfide Sulfones": Part II", pp. 111-112.
	DF	M. Yoshitake, et al., "Flemions and PEFC", pp. 509-512.
	DG	R.W., Kopitzke, et al, "Sulfonation of Poly(phenylquinoxaline) Film", Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 86 (1998), pp. 1197-1199.
	DH	Y.N. Liu, et al., "Synthesis and Characterization of Poly(phenylene Sulfide Sulfone): Part I", pp. 109-110.
	DI	A. Bhatnagar, et al., "Synthesis and Characterization of Advanced Fire Resistant Engineering Thermoplastics", pp. 227-228.
	DJ	Copy of PCT International Search Report (Form PCT/ISA/210) dated 26 Jan. 1999 (3 pages) re Int'l Appln. No. PCT/US98/17898.
Examiner:	RAM	Date: 11/20/02



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UNITED STATES PATENT DOCUMENTS							
EXAM. INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FIL. DATE IF APPR
BAM	AA	US 6,187,231	Feb. 13, 2001	Sansone, et al.	264	41	
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